CLAIMS

1. A method of coding a digital audio signal frame (S) as a binary output sequence (Φ), in which a maximum number Nmax of coding bits is defined for a set of parameters that can be calculated according to the signal frame, which set is composed of a first and of a second subset, the method comprising the following steps:

- calculating the parameters of the first subset, and coding these parameters on a number N0 of coding bits such that N0 < Nmax;
- determining an allocation of Nmax - N0 coding bits for the parameters of the second subset; and
- ranking the Nmax - N0 coding bits allocated to the parameters of the second subset in a determined order,

in which the allocation and/or the order of ranking of the Nmax - N0 coding bits is determined as a function of the coded parameters of the first subset, the method furthermore comprising the following steps in response to the indication of a number N of bits of the binary output sequence that are available for the coding of said set of parameters, with N0 < N ≤ Nmax:

- selecting the second subset's parameters to which are allocated the N - N0 coding bits ranked first in said order;
- calculating the selected parameters of the second subset, and coding these parameters so as to produce said N - N0 coding bits ranked first; and
- inserting into the output sequence the N0 coding bits of the first subset as well as the N - N0 coding bits of the selected parameters of the second subset.

2. The method as claimed in claim 1, in which the order of ranking of the coding bits allocated to the parameters of the second subset is variable from one

frame to another.

3. The method as claimed in claim 1 or 2, in which N < Nmax.

4. The method as claimed in any one of the preceding claims, in which the order of ranking of the coding bits allocated to the parameters of the second subset is an order of decreasing importance determined as a function of at least the coded parameters of the first subset.

5. The method as claimed in claim 4, in which the order of ranking of the coding bits allocated to the parameters of the second subset is determined with the aid of at least one psychoacoustic criterion as a function of the coded parameters of the first subset.

6. The method as claimed in claim 5, in which the parameters of the second subset pertain to spectral bands of the signal, in which a spectral envelope of the coded signal is estimated on the basis of the coded parameters of the first subset, in which a curve of frequency masking is calculated by applying an auditory perception model to the estimated spectral envelope, and in which the psychoacoustic criterion makes reference to the level of the estimated spectral envelope with respect to the masking curve in each spectral band.

7. The method as claimed in any one of claims 4 to 6, in which Nmax = N.

8. The method as claimed in any one of the preceding claims, in which the coding bits are ordered in the output sequence in such a way that the N0 coding bits of the first subset precede the N - N0 coding bits of the selected parameters of the second subset and that

the respective coding bits of the selected parameters of the second subset appear therein in the order determined for said coding bits.

9. The method as claimed in any one of the preceding claims, in which the number N varies from one frame to another.

10. The method as claimed in any one of the preceding claims, in which the coding of the parameters of the first subset is at variable bit rate, thereby varying the number N0 from one frame to another.

11. The method as claimed in any one of the preceding claims, in which the first subset comprises parameters calculated by a coder kernel (1).

12. The method as claimed in claim 11, in which the coder kernel (1) has a lower frequency band of operation than the bandwidth of the signal to be coded, and in which the first subset furthermore comprises energy levels of the audio signal that are associated with frequency bands higher than the operating band of the coder kernel.

13. The method as claimed in each of claims 8 and 12, in which the coding bits of the first subset are ordered in the output sequence in such a way that the coding bits of the parameters calculated by the coder kernel are immediately followed by the coding bits of the energy levels associated with the higher frequency bands.

14. The method as claimed in any one of claims 11 to 13, in which a signal of difference between the signal to be coded and a synthesis signal derived from the coded parameters produced by the coder kernel is estimated, and in which the first subset furthermore

comprises energy levels of the difference signal that are associated with frequency bands included in the operating band of the coder kernel.

15. The method as claimed in claim 8 and any one of claims 12 to 14, in which the coding bits of the first subset are ordered in the output sequence in such a way that the coding bits of the parameters calculated by the coder kernel (1) are followed by the coding bits of the energy levels associated with the frequency band.

16. A method of decoding a binary input sequence (Φ') so as to synthesize a digital audio signal ($\hat{S}$), in which a maximum number Nmax of coding bits is defined for a set of parameters for describing a signal frame, which set is composed of a first and a second subset, the input sequence comprising, for a signal frame, a number N' of coding bits for said set of parameters, with N' ≤ Nmax, the method comprising the following steps:

- extracting, from said N' bits of the input sequence, a number N0 of coding bits of the parameters of the first subset if N0 < N';
- recovering the parameters of the first subset on the basis of said N0 coding bits extracted;
- determining an allocation of Nmax - N0 coding bits for the parameters of the second subset; and
- ranking the Nmax - N0 coding bits allocated to the parameters of the second subset in a determined order,

in which the allocation and/or the order of ranking of the Nmax - N0 coding bits is determined as a function of the recovered parameters of the first subset, the method furthermore comprising the following steps:

- selecting the second subset's parameters to which are allocated the N' - N0 coding bits ranked first in said order;
- extracting, from said N' bits of the input

sequence, N' - N0 coding bits of the selected parameters of the second subset;

- recovering the selected parameters of the second subset on the basis of said N' - N0 coding bits extracted; and
- synthesizing the signal frame by using the recovered parameters of the first and second subsets.

17. The method as claimed in claim 16, in which the order of ranking of the coding bits allocated to the parameters of the second subset is variable from one frame to another.

18. The method as claimed in claim 16 or 17, in which N' < Nmax.

19. The method as claimed in any one of claims 16 to 18, in which the order of ranking of the coding bits allocated to the parameters of the second subset is an order of decreasing importance determined as a function of at least the recovered parameters of the first subset.

20. The method as claimed in claim 19, in which the order of ranking of the coding bits allocated to the parameters of the second subset is determined with the aid of at least one psychoacoustic criterion as a function of the recovered parameters of the first subset.

21. The method as claimed in claim 20, in which the parameters of the second subset pertain to spectral bands of the signal, in which a spectral envelope of the signal is estimated on the basis of the recovered parameters of the first subset, in which a curve of frequency masking is calculated by applying an auditory perception model to the estimated spectral envelope,

and in which the psychoacoustic criterion makes reference to the level of the estimated spectral envelope with respect to the masking curve in each spectral band.

22. The method as claimed in any one of claims 16 to 21, in which the N0 coding bits of the parameters of the first subset are extracted from the N' bits received at positions of the sequence which precede the positions from which are extracted the N' - N0 coding bits of the selected parameters of the second subset.

23. The method as claimed in any one of claims 16 to 22, in which, to synthesize the signal frame, nonselected parameters of the second subset are estimated by interpolation on the basis of at least selected parameters recovered on the basis of said N' - N0 coding bits extracted.

24. The method as claimed in any one of claims 16 to 23, in which the first subset comprises input parameters of a decoder kernel (21).

25. The method as claimed in claim 24, in which the decoder kernel (21) has a lower frequency band of operation than the bandwidth of the signal to be synthesized, and in which the first subset furthermore comprises energy levels of the audio signal that are associated with frequency bands higher than the operating band of the decoder kernel.

26. The method as claimed in each of claims 22 and 25, in which the coding bits of the first subset in the input sequence are ordered in such a way that the coding bits of the input parameters of the decoder kernel (21) are immediately followed by the coding bits of the energy levels associated with the higher frequency bands.

27. The method as claimed in claim 26, comprising the following steps if the N' bits of the input sequence (Φ') are limited to the coding bits of the input parameters of the decoder kernel (21) and to part at least of the coding bits of the energy levels associated with the higher frequency bands:

- extracting from the input sequence the coding bits of the input parameters of the decoder kernel and said part of the coding bits of the energy levels;
- synthesizing a base signal (S') in the decoder kernel and recovering energy levels associated with the higher frequency bands on the basis of said extracted coding bits;
- calculating a spectrum of the base signal;
- assigning an energy level to each higher band with which is associated an uncoded energy level in the input sequence;
- synthesizing spectral components for each higher frequency band on the basis of the corresponding energy level and of the spectrum of the base signal in at least one band of said spectrum;
- applying a transformation into the time domain to the synthesized spectral components so as to obtain a base signal correction signal; and
- adding together the base signal and the correction signal so as to synthesize the signal frame.

28. The method as claimed in claim 27, in which the energy level assigned to a higher band with which is associated an uncoded energy level in the input sequence is a fraction of a perceptual masking level calculated in accordance with the spectrum of the base signal and the energy levels recovered on the basis of the extracted coding bits.

29. The method as claimed in any one of claims 24 to 28, in which a base signal (S') is synthesized in the

decoder kernel, and in which the first subset furthermore comprises energy levels of a signal of difference between the signal to be synthesized and the base signal that are associated with frequency bands included in the operating band of the coder kernel.

30. The method as claimed in any one of claims 25, 26 and 29, in which, for N0 < N' < Nmax, unselected parameters of the second subset that pertain to spectral components in frequency bands are estimated with the aid of a calculated spectrum of the base signal and/or selected parameters recovered on the basis of said N' < N0 coding bits extracted.

31. The method as claimed in claim 30, in which the unselected parameters of the second subset in a frequency band are estimated with the aid of a spectral neighborhood of said band, which neighborhood is determined on the basis of the N' coding bits of the input sequence.

32. The method as claimed in claim 22 and any one of claims 25 to 31, in which the coding bits of the input parameters of the decoder kernel (21) are extracted from the N' bits received at positions of the sequence which precede the positions from which are extracted the coding bits of the energy levels associated with the frequency bands.

33. The method as claimed in any one of claims 16 to 32, in which the number N' varies from one frame to another.

34. The method as claimed in any one of claims 16 to 33, in which the number N0 varies from one frame to another.

35. An audio coder, comprising means of digital signal

processing that are devised to implement a method of coding as claimed in any one of claims 1 to 15.

36. An audio decoder, comprising means of digital signal processing that are devised to implement a method of decoding as claimed in any one of claims 16 to 34.